THE EGG AND FIRST INSTAR LARVA OF *STENOSMYLUS* (NEUROPTERA: OSMYLIDAE)

By T. R. New
Zoology Department, La Trobe University, Bundoora, Vic. 3083.

Abstract

The egg, oviruptor, and first instar larva of *Stenosmylus tenuis* (Walker) are described and figured.

Introduction

Species of *Stenosmylus* McLachlan are amongst the most common representatives of the Osmylidae in Victoria but, in common with other Stenosmylinae, nothing has been recorded of their early stages and biology beyond a general comment that larvae are found under bark of eucalypts (Riek, 1970). Indeed, other than for a few notes on *Porismus strigatus* (see Gallard, 1914a, 1914b, 1922), little specific information is available for Australian members of this family. Most generalisations on Osmylid biology and preadult morphology have resulted from studies on the European semi-aquatic species, *Osmylus fulvicephalus* (Scopoli) (David 1936; Balduf 1939; Ward 1965, for examples), but a brief description of the larva of the Japanese *Spilosmylus flavicornis* (McLachlan) (Spilosylinae) was given by Wakashima (1957), Tillyard (1926) figured the larva of the New Zealand species *Euosmylus stellae* McLachlan, and Riek (1970) that of *Kempynus* (Kalosmylinae).

Several specimens of *Stenosmylus tenuis* (Walker), identified by comparison of genitalia with figures by Kimmins (1940), were captured on *Acacia* at Bundoora during February and March, 1974. Fertile eggs were obtained from several females kept alive, but no larvae survived beyond the first instar. In view of the paucity of published information on these insects, descriptions of the egg and first instar are given in this note.

Egg

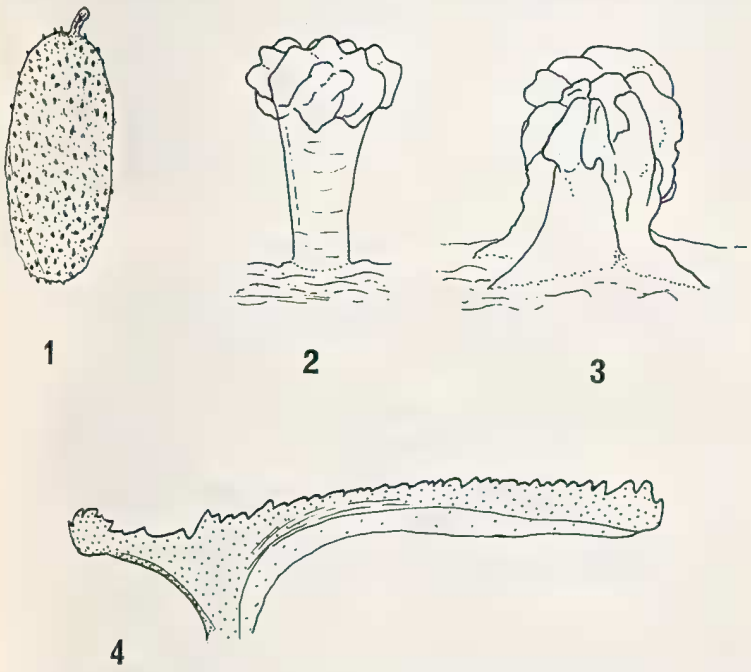
Pale yellow when laid, darkening to pale brown and dark brown before hatching; ovoid with extended micropylar stalk (Fig. 1). Greatest length (mm, N-10) 0.855 (0.840-0.865); greatest breadth 0.450 (0.435-0.455). Chorion with numerous projections, these being of two distinct types which occur in approximately equal numbers: (1) a simple capitate column (Fig. 2) and (2) a more elaborate form having the column expanded to form well-developed buttresses (Fig. 3). Oviruptor (Fig. 4) elongate; an anterior projection with about six short teeth, an intermediate area over the fulcrum with few more widely spaced and deeper teeth, and a long posterior region with numerous shallow teeth; the whole structure well sclerotised.

Larva

Colour dark greyish brown, head slightly darker than rest of body; ventral side slightly paler; eyes black.

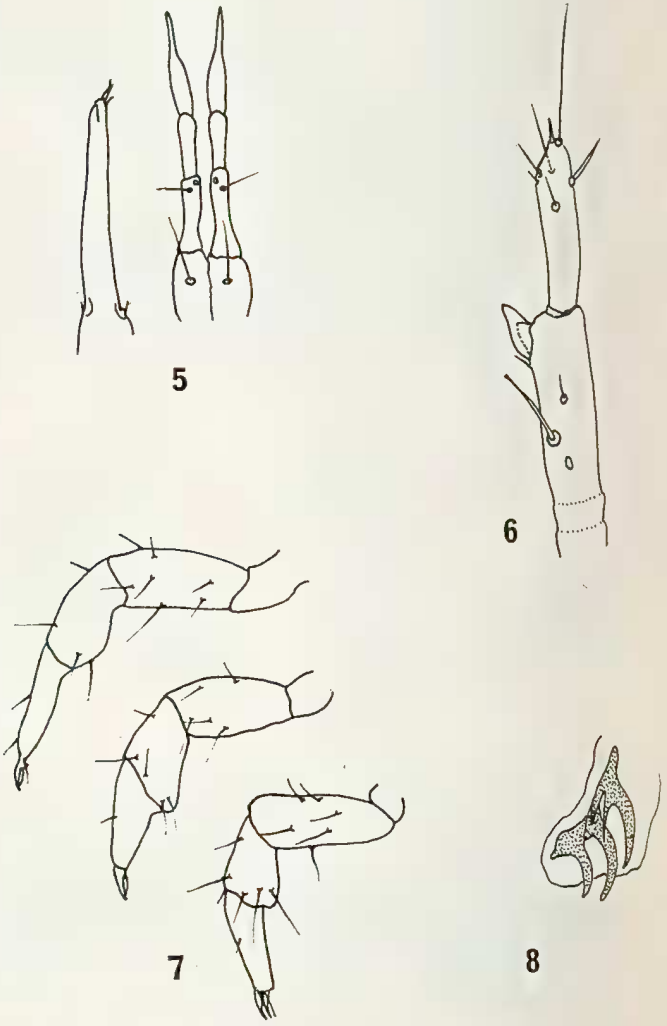
Greatest length (tip of mandible—apex of abdomen, mm, N = 5 for this and subsequent measurements) 1.80. Of usual osmylid form with mandibles and maxillae extending straight forwards from head. Mandible length 0.570; slightly serrate at apex, as are maxillae. Labium (Fig. 5) with palpi three-segmented; mentum with a single seta on each side; basal segment with one or two short setae towards apex, second segment bare, third segment constricted about half way along its length, apex with 2-5 minute hairs. Antennae three-segmented; first segment short; second segment (Fig. 6) annulated except towards apex, with few setae and a prominent hyaline cone near apex, apical segment with setae towards apex, the longest one adjacent to the apicale process. Vertex, width 0.285, with few setae: one dorsal and one anterior to each eye, one longer (0.120) lateral seta behind widest part of head, and one short (0.045) dorsal seta either side of midline.

Cervix with anterior row of four evenly spaced setae (length 0.075) and a small lateral one beyond each external seta. A row of four similar long setae in the same relative positions on each thoracic and abdominal segment; the lateral ones with small basal prominences and longer than others (0.195-0.215). Four longitudinal rows of these setae on each abdominal segment. Each segment bears four to six short setae in a row between main laterodorsal rows, and two short setae between each laterodorsal and lateral row. Greatest width of thorax and



Figs 1-4. *Stenosmylus tenuis*. 1, egg; 2, 3, chorionic processes, drawn from scanning electron micrographs; 4, oviruptor, lateral aspect, anterior to left.

anterior region of abdomen 0.285-0.315, the abdomen tapering to a narrow apex. Legs as in Fig. 7, each tarsus with two simple claws and a narrow empodium. Terminal appendages short, blunt, with three or four curved ventral crochets (Fig. 8); a transverse row of seven short setae before point of division and each with one slightly longer seta (0.045) on inner border.



Figs 5-8. *Stenosmylus tenuis*, first instar larva. 5, labium, with apex of palp enlarged to left of drawing of whole labium; 6, apical region of antenna; 7, legs, foreleg towards top of page; 8, abdominal crochets.

Comments

The eggs were laid singly or in small groups, with the long axis adpressed to a substrate, or were placed vertically in grooves: a few laid in a block of plastic foam, for instance, were deeply inserted with the micropyle barely projecting, and this may reflect a natural habit of oviposition in bark crevices. When wet foam was provided, as a water source, all eggs laid were inserted in it. The chorionic projections are adhesive and a number of small particles were found on them. The functions of the two kinds, which do not intergrade, are unknown. Eggs darkened after about two days and hatched after 11-15 days (at 25°C).

In many characters the larva of *Stenosmylus* resembles that of *Osmylus*. Withycombe (1925) recorded that the first instar of *Osmylus* has a strong projection at the end of the second antennal segment. Such a structure was recorded also in the larva of *Nallachius* (Dilaridae) from North America described by Gurney (1947). The Dilaridae are absent from Australia, but are clearly related to the Osmylidae. This antennal structure was not noted in the fully-grown larva of *Spilosmylus* by Kawashima (1957) and abdominal hooks were absent in his specimens. Kawashima's figure of the larva indicates that the body setation (instar III) is in general short, but that *Spilosmylus* resembles *Stenosmylus* in having a single transverse row of setae across each of abdominal segments I-VIII: *Osmylus,* in contrast, has two setal rows. *Kempynus,* from Riek's (1970) figure, appears to resemble *Osmylus* in this respect. The reduced number of labial palp segments in Stenosmylus is also unusual.

The natural habitat of *Stenosmylus* larvae is unknown. The first instar larvae were very active and moved freely on pieces of bark and in leaf litter provided. Several were seen to briefly probe dead Collembola. Their activity suggests that they may be cortical rather than semi-aquatic, but further work is needed to confirm this.

References

Balduf, W. V., 1939. *The bionomics of entomophagous insects.* II. Chicago.

David, K., 1936. Beitrage zur Anatomie und lebensgeschicte von *Osmylus chrysops* L. *Z. Morph. Okol. Tiere* 31: 151-206.

Gallard, L., 1914a. *Porismus strigatus. Aust. Nat.* 3: 26.

Gallard, L., 1914b. Notes on *Porismus strigatus. Aust. Nat.* 3: 45-46.

Gallard, L., 1922. Notes on *Porismus strigatus. Aust. Nat.* 1: 11-12.

Gurney, A. B., 1947. Notes on Dilaridae and Berothidae, with special reference to the immature stages of the Nearctic genera (Neuroptera). *Psyche* 54: 145-169.

Kimmins, D. E., 1940. A revision of the Osmylid subfamilies Stenosmylinae and Kalosmylinae (Neuroptera). *Novit. Zool.* 42: 165-201.

Kawashima, K., 1957. Bionomics and earlier stages of some Japanese Neuroptera. I. *Spilosmylus flavicornis* (McLachlan) (Osmylidae). *Mushi* 30: 67-71.

Riek, E. F., 1970. Neuroptera, pp 472-494 in *The Insects of Australia,* ed. I. M. Mackerras. Melbourne.

Tillyard, R. J., 1926. *The Insects of Australia and New Zealand.* Sydney.

Ward, P. H., 1965. A contribution to the knowledge of the biology of *Osmylus fulvicephalus* (Scopoli 1763) Neuroptera, Osmylidae). *Entomologists's Gaz.* 16: 175-182.

Withycombe, C. L., 1925. Some aspects of the biology and morphology of the Neuroptera. *Trans. ent. Soc. Lond.* 1924: 303-411.